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A SIMPLIFIED PROCEDURE FOR CLEANING AND FILLING AEROSOL CYLINDERS IN THE LABORATORY

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The method described in ET-245 for filling experimental aerosol cylinders in the laboratory has now been simplified so that the entire operation is carried out after the cleaned cylinder has been placed on the balance. The equipment has been redesigned so that there is no contamination by moisture during the filling operation. The elimination of moisture is very important in working with formulations containing pyrethrum and DDT and greenhouse formulations containing tetraethyl pyrophosphate and parathion.

Cleaning the Cylinders

In order to prevent nozzle stoppage, the aerosol cylinders must be clean. Cylinders filled repeatedly with pyrethrum aerosols accumulate deposits of material that is insoluble in the Freon-12 (dichlorodifluoromethane). Such a cylinder is cleaned by evacuating and filling it to one-fourth its capacity with methylene chloride, placing it on its side for 30 minutes, turning it around about 45 degrees, and letting it stand again for 30 minutes. This procedure is repeated until a complete revolution of the cylinder has been made. The valve and eduction tube are then removed, and a small flashlight bulb connected to an outside battery is lowered into the cylinder to illuminate the interior. If the deposit has been removed from the walls, the methylene chloride is poured out and the cylinder is rinsed with small quantities of fresh methylene chloride until the liquid remains clear. The cylinder is inverted and dried by means of a compressed-air tube placed on the inside. If the cylinder shows signs of rusting or pitting, it is filled with 1:1 hydrochloric acid and allowed to stand for 5 minutes. The acid is removed and the cylinder is placed over a live steam jet to remove all traces of acid. It is then dried with a stream of air and the valve unit is screwed into place.

Another method of cleaning is used for cylinders filled with tetraethyl pyrophosphate aerosols, which form a white deposit of iron phosphate on standing. After a number of fillings this deposit scales off and drops to

the bottom of the tank and eventually clogs the nozzle. This deposit may be removed by treating the cylinders with hydrochloric acid and drying them as described above. If the cylinders are being used for only intermittent treatments, they should be cleaned before being refilled. Cylinders in constant use should be cleaned after three fillings.

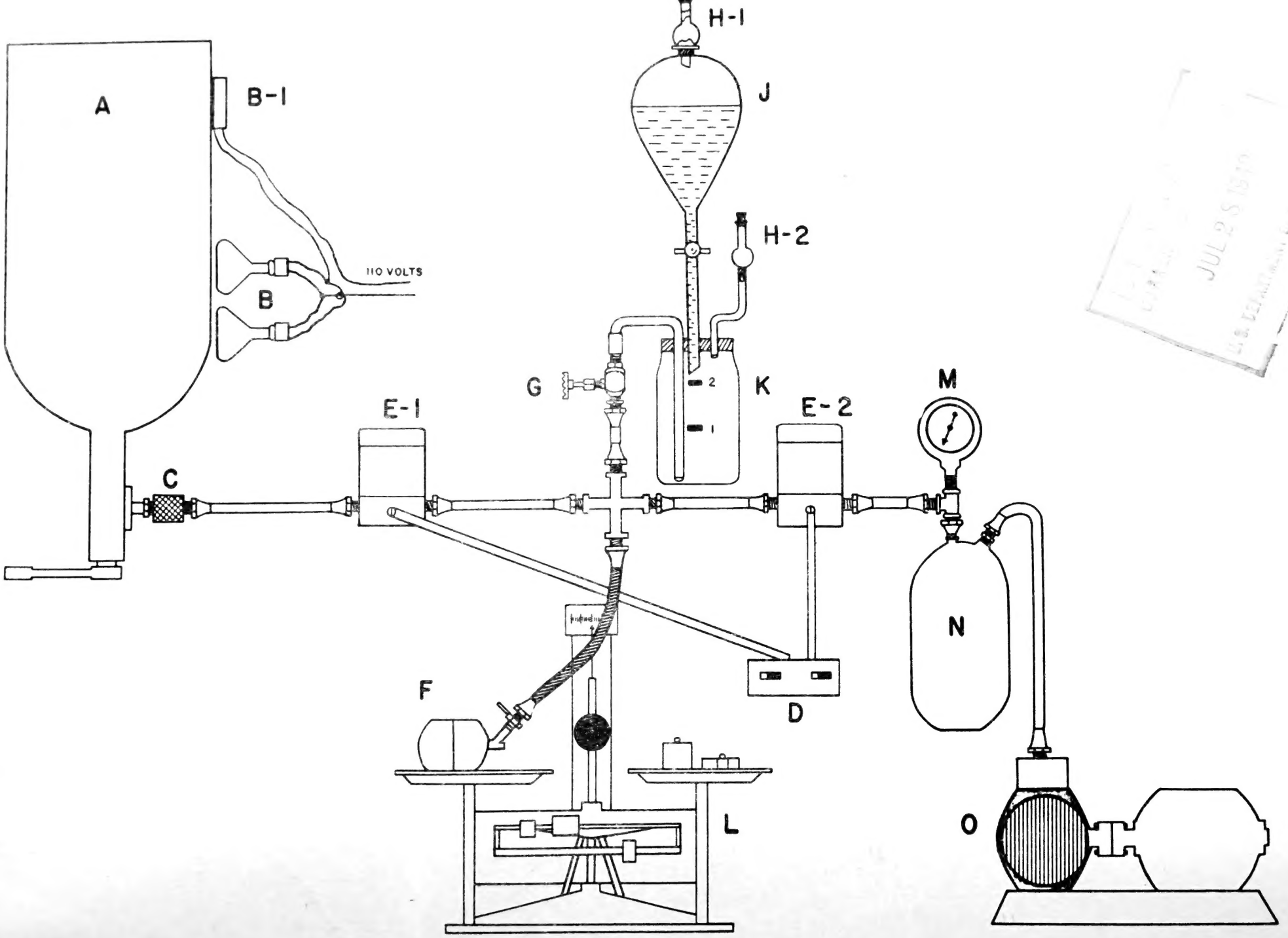
Filling the Cylinders

The apparatus used for filling the cylinders is shown in the accompanying drawing. The solution containing predetermined amounts of insecticide and solvent is placed in the reservoir, J, and the desired amount is allowed to run into the calibrated jar, K. Drying tubes, H-1 and H-2, are used to prevent the solution from absorbing moisture during the filling operation. The liquefied-gas storage cylinder, A, is connected to the system with a refrigeration quick-coupler, C, and heated to 110° F. with two infrared lamps, B. A thermostat, B-1, prevents overheating. The cylinder that is to be filled, F, is placed on the balance, L, and connected with the refrigeration hose. The valve on the cylinder F is opened, and the solenoid valves, E-1 and E-2, and the needle valve, G, are closed. Valves E-1 and E-2 are operated with switch D. The vacuum reservoir tank, N, is then connected with the vacuum pump, O. The pump should be capable of producing a vacuum of at least 25 inches of mercury. Valve E-2 is then opened, and when the gage, M, registers a 25-inch vacuum it is again closed. Valve G is opened, and the measured amount of insecticide from the jar K is drawn into cylinder F. Valve G is then closed, and the balance L is tared in preparation for adding the predetermined amount of liquefied gas. Valve E-1 is opened, and when the correct amount of liquefied gas has been added, this valve and the cylinder valve are closed. Valve E-2 is then opened to remove the liquefied gas within the system. The filled aerosol cylinder is removed and the operation repeated with an empty cylinder.

By this method an aerosol cylinder can be filled in approximately 30 seconds.

Equipment Needed for Filling Cylinders

1 Vacuum pump capable of producing a vacuum of 25 inches of mercury (O).
1 Vacuum reservoir tank, 130 cubic inches (N).
1 Vacuum gage (M).
1 Separatory funnel, 2000 to 4000 ml. (J).
2 Drying tubes (H-1 and H-2).
1 Wide-mouth jar (K).
2 Solenoid valves, 3/16-inch orifice (E-1 and E-2), Detroit Lubricator Co., 115-230 a.c., No. 683.
1 Needle valve, 1/8-inch (G), IPT Matheson No. 28 or equivalent.
1 Double wall switch (D).
1 Laboratory balance, 10-kg. capacity (L).
10 ft. of 1/4-inch (i.d.) copper tubing.
14 Flared nuts, 1/4-inch SAE.
1 Flared cross, 1/4-inch SAE.
2 Swivel connectors, 1/4-inch SAE.
1 Refrigeration quick-coupler, 1/4-inch SAE (C).
1 36-inch refrigerator hose with quick couplers.
1 Thermostat (B-1), Minneapolis-Honeywell Aquastat, Type LA 409 AIX-1, or equivalent.
2 Infrared lamps, 250 watts (B).
6 Flared unions, 1/4-inch IPT x 1/4-inch SAE to make necessary connections.



Apparatus for filling aerosol cylinders in the laboratory.